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MEASURING AIRCREW WORKLOAD: PROBLEMS, PROGRESS, AND PROMISES

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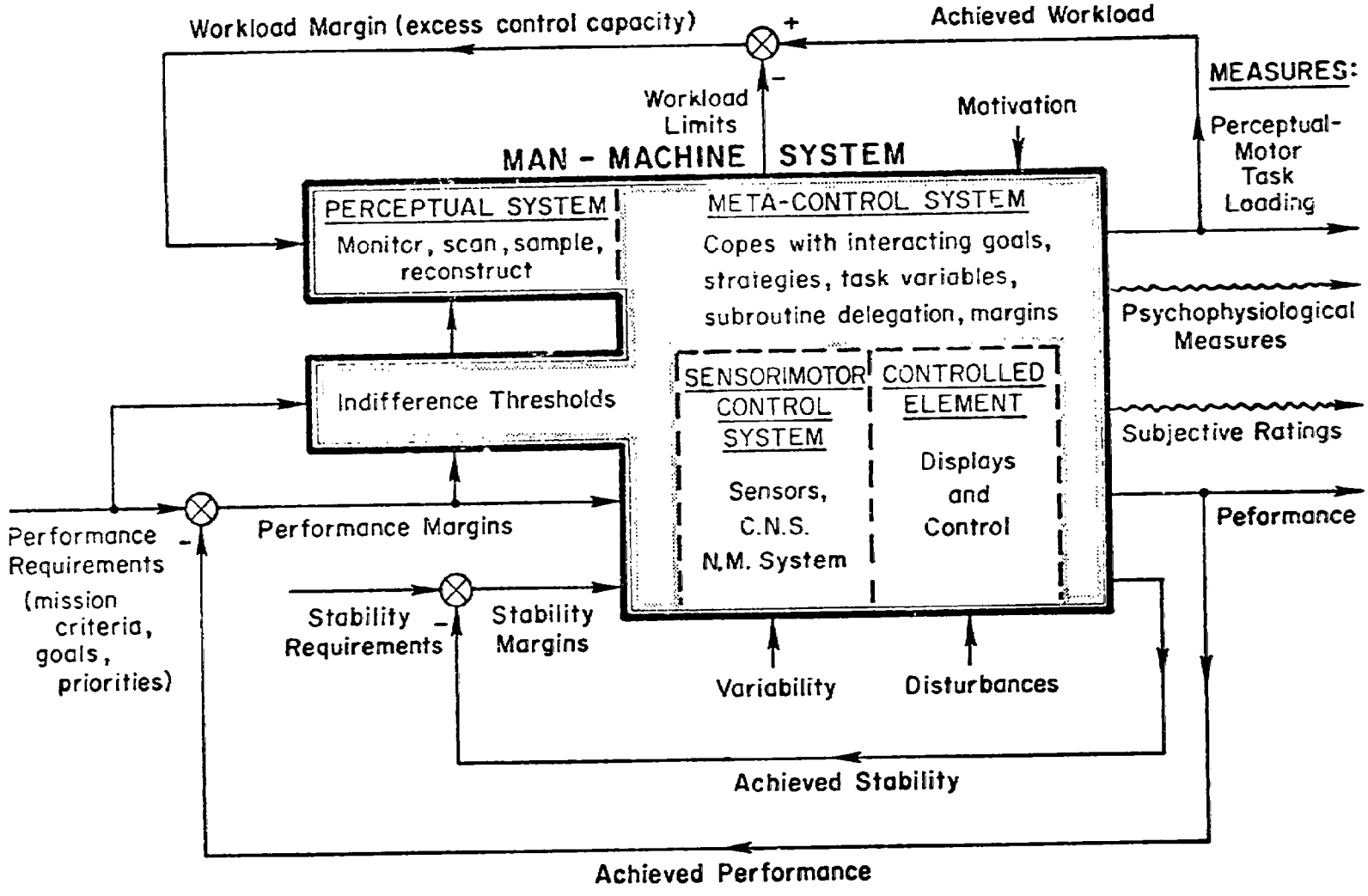
An overview of the problems of defining, quantifying, and measuring mental workload during aircrew tasks is given based on our work in the areas of aircraft handling qualities, pilot model measurement and prediction, multi-display scanning and psychophysiological correlates of workload. The continued promise and problems with psychopysiological measures is assessed and the importance of some new multidimensional workload rating techniques is emphasized. The lack of unifying theoretical approach is identified as the main impediment to progress, and an approach is suggested, that can handle both continuous and discrete task loads. A review is given of some new workload measurement concepts such as Non-Invasive Pilot Identification Program, the "imbedded surrogate" auxiliary task method, and the measurement of workload margin via the Cross-Coupled-Instability Task (CCIT).

THE PROBLEM :

BLOCK DIAGRAM SHOWING INTERACTIONS AMONG MAN-MACHINE STABILITY, PERFORMANCE, AND WORKLOAD



CRITERIA FOR WORKLOAD MEASURES

1. RELEVANT:

   TO PROBLEM & SOLUTION

2. SENSITIVE:

   MONOTONIC W.R.T SUBJECTIVE WL. HIGH "TEST-POWER" WRT WL VARIABLES. INSENSITIVE TO OTHER VARIABLES

3. CONCORDANT:

   UNIVERSAL EFFECTS IN TARGET POPULATION

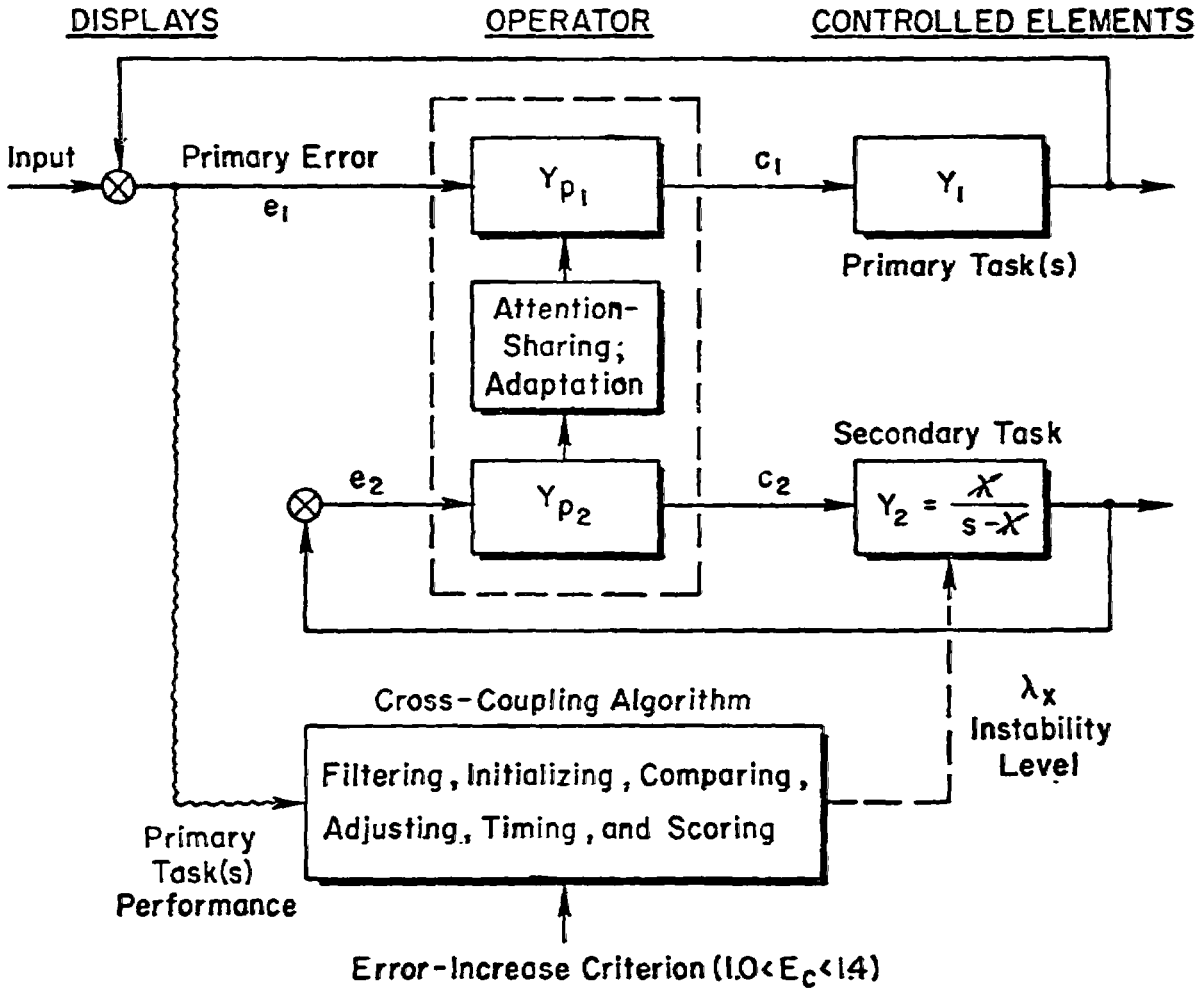
4. RELIABLE:

   TEST-RETEST
   "DIFFERENTIAL STABILITY" WRT PRACTICE
   VALIDATED; WITH NORMS

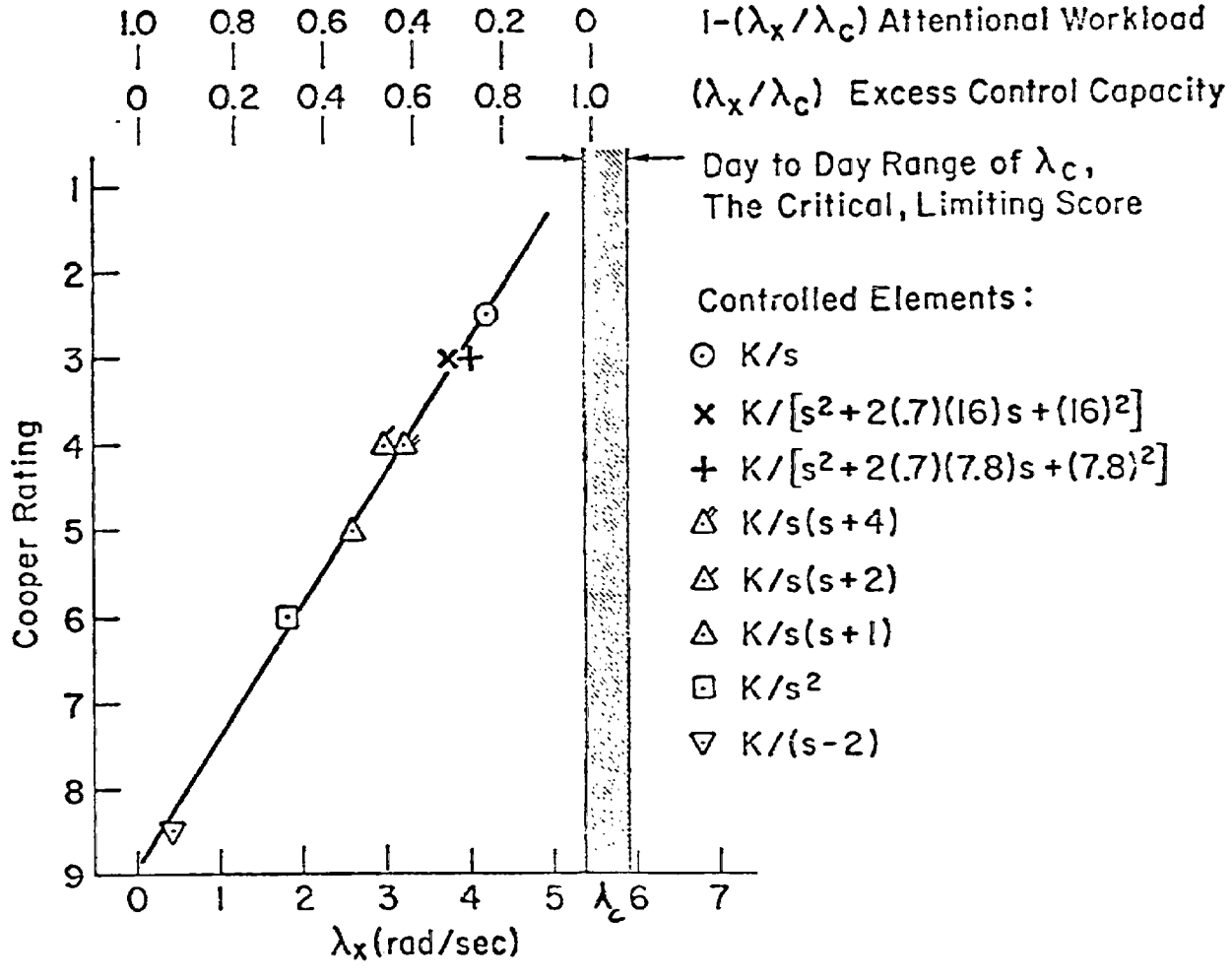
5. CONVENIENT:

   PORTABLE
   EASY TO LEARN

ELEMENTS OF THE CROSS-COUPLED INSTABILITY TASK (CCIT)



CROSS ADAPTIVE MEASURE OF EXCESS CONTROL CAPACITY FOR SEVERAL EXAMPLES OF PRIMARY CONTROLLED ELEMENTS



TYPICAL APPLICATION OF ADAPTIVE-WORKLOAD TESTING